

## Index

- $\beta$  Lyr, 24  
 $\omega$  Cen, 58, 77, 380  
Öpik, 19  
47 Tuc, 75, 184, 380
- Abell 2256, 252  
Abell 370, 256, 365  
Abell 665, 295, 297  
abundance gradients, 59, 61, 63, 64, 85,  
119, 122, 123, 125, 155, 157,  
161, 208, 265, 272, 277, 284–  
286, 331  
abundance–velocity–dispersion relation,  
113, 119, 125, 279, 281, 289,  
311–314, 361, 365, 368  
AGB stars, 185, 187, 189, 191, 194, 203,  
265  
age–metallicity degeneracy, 186, 189, 275,  
276, 304, 365  
age–metallicity relation, 119, 122, 123,  
125, 149, 157, 206, 207, 377  
age–velocity–dispersion relation, 120–122,  
125, 148, 377  
Alpher, 17  
And I, 184, 185  
And II, 184, 185  
And III, 184  
angular momentum, 147  
anisotropic models, 241  
anisotropic velocity distribution, 242  
Arp 2, 64, 77  
asymmetric drift, 112  
Atkinson, 13
- Baade, v, vii, 17, 19, 23–35, 37, 45, 46,  
51, 52, 57–59, 69, 83, 95, 169,  
181–191, 197, 263, 299, 357,  
373, 376, 382  
Baade sheet, 182, 197  
Baade's Window, 26, 34, 54, 116, 153,  
358, 369  
bar instability, 155  
baryon fraction, 257, 259  
Bethe, 14, 16, 17, 28  
binaries, 74, 76, 78–80, 84, 150, 152,  
161, 205, 272, 291  
Blaauw, 50, 183, 329, 380
- black holes in galactic nuclei, 239–242  
blue stragglers, 66, 76, 78, 131, 134, 278  
Bottlinger, 383  
Bottlinger diagram, 42  
brown dwarfs, 77, 222  
Bulge  
    abundances, 164  
    age, 164, 370  
    bulge formation, 155, 291  
Butcher–Oemler effect, 328, 330, 332,  
333, 336, 338
- Carbon stars, 37, 40, 49, 58, 59, 185,  
191, 194, 203  
Carina dwarf, 66, 69, 194, 386  
Centaurus A, 243  
Cepheids, 27, 58, 59, 79, 104, 169, 172,  
174, 196, 203, 204, 209, 212  
Chandrasekhar, 14, 17, 48  
chemical evolution, 63, 109, 125, 145–  
163, 176, 191, 222, 367, 378,  
379  
Cl 0024+1654, 254  
closure density, 257, 259  
clusters  
    arclets, 255, 256  
    distant, 340  
    X-rays, 251  
COBE, 155, 237, 297  
Coma cluster, 98, 294, 296, 297, 310–  
313, 361, 365, 369  
cooling flows, 98, 99, 253, 254, 256, 259  
CS22873–139, 84
- dark matter  
    a stellar population?, 221, 235  
    clusters, 251–260  
    Cold Dark Matter theory, 146  
    elliptical galaxies, 242–245  
    Galaxy, 217–226, 375  
    shape of halos, 234, 246  
    spiral galaxies, 227–238  
Darwin, 3  
DDO 210, 196  
DDO photometry, 220  
disk  
    evolution, 165



- disk galaxies
  - evolution, 330-334
- disk heating, 121, 148, 149, 233
- Disk Population, 47, 50-52
- distance indicators, 170, 279, 293, 309, 310, 312-314
- Draco dwarf, 182, 194, 195
- Eddington, 5, 6, 8, 9, 12, 17
- Eggen, Lynden-Bell and Sandage model, 53, 63, 109, 110, 113, 116, 147, 153
- Einstein, 251, 254
- Einstein radius, 223
- elliptical galaxies
  - ages, 181, 183, 185, 264, 273-281, 294, 311, 364-366, 371, 389
  - chemical evolution, 372
  - colors, 309
  - evolution, 334-336
  - stellar populations, 273-281, 299-307, 309-316, 361-364
  - UV upturn, 272, 360, 369
- epicyclic frequency, 233
- exponential disk, 233
- exponential scalelength, 221, 233
- Fornax cluster, 98, 99, 244, 310
- Fornax dwarf, vii, 27, 31, 117, 171, 179, 195, 208, 209
- fundamental plane, 242, 279, 293-298, 314, 361-366, 368, 370, 390
- G-dwarf problem, 126, 149, 375, 376
- G-dwarf problem, 165
- Galactic bulge, 113, 147, 152-156, 222, 357-360
- Galactic center, 51
  - black hole, 370
- galactic evolution, 50, 52, 53, 109, 113, 326, 329-351, 379
- Galactic fountain, 141
- Galactic orbits, 43, 120
- galaxy counts, 320, 321, 343-351
- galaxy formation, 109, 125, 145-162, 171, 246, 337, 355
- galaxy morphology, vii, 148, 155, 326, 351
- Gamow, 12, 14, 17, 18
- Geneva photometry, 123, 126
- giant branch, 5, 6, 9, 17, 19, 49, 76, 183
- Gingerich, 32
- globular cluster systems, 95-103
  - dynamical properties, 62-63
  - formation, 63-69, 96, 97
  - metallicity distribution, 60-62, 96
  - specific frequency, 98
  - subsystems, 83
- globular clusters, 73, 73--79, 82, 362, 381
  - AGB stars, 191
  - ages, 48, 49, 54, 63-69, 76, 81, 265, 388
  - CM diagram, 19, 28, 48, 58, 68, 75
  - distances, 81
  - dynamical evolution, 79
  - metallicity distribution, 388
  - spatial distribution, 59
- globular clusters systems
  - subsystems, 51, 53, 83, 207
- GR 8, 197
- gravitational lens, 254
- halo field stars, 59, 83-93, 114, 129-138
- halo formation, 137, 153
- HD140283, 44
- Helium abundance, 76, 265, 358
- Helium enrichment, 358, 360, 364
- Helmholtz, 3
- HI layers
  - thickness, 232
- high-latitude A stars, 132
- high-velocity clouds, 139-143
- high-velocity stars, 37, 38, 42, 46
- Hipparchos, 87, 91, 127
- Hipparcos, 81
- horizontal branch, 49, 64, 65, 76, 83, 86-89, 91, 92, 115, 131-136, 155, 171, 206, 208, 263-265, 268, 269, 271, 272, 278
- Hoyle, 18, 19, 48, 52, 84
- Hubble, vii, 23, 27, 30, 31, 297, 329
- Hubble Deep Field, 339
- Hubble Space Telescope, 67, 68, 77, 78, 164, 183, 184, 188, 195, 197, 208, 209, 241, 246, 272, 320, 325-327, 332, 338, 339, 360, 369, 370, 387, 389, 390
  - Medium Deep Survey, 326-328
- Hubble types, 304, 390
- Humason, 31
- Hyades, 48
- Hydra I cluster, 98

- Hydra-Centaurus region, 314  
hydrostatic equilibrium, 253
- IC 10, 197  
IC 1613, 197  
IC 2006, 245, 246  
IC 4499, 77  
initial mass function, 77, 78, 145, 150-  
154, 156, 157, 193, 221, 230,  
274, 291, 294, 330, 335, 361-  
364, 382  
instability strip, 204, 209  
Intermediate Population II, 47, 52, 54,  
84, 92, 376
- Jeans, 6  
Jeans equation, 218, 219, 240, 243
- K<sub>z</sub>, 218, 232  
Kapteyn, 34, 221  
Keck Telescope, 339  
Kelvin, Lord, 3, 4
- Large Magellanic Cloud  
abundances, 173  
clusters, 169, 171, 202, 205  
exponential disk, 172  
orientation, 172  
RR Lyrae stars, 172  
star formation, 175  
Leo A dwarf, 197  
Leo I dwarf, 188, 195, 199  
Leo II dwarf, 182  
Lindblad, 382  
Lockyer, 4, 5, 8  
low-velocity stars, 37, 46  
luminosity evolution, 346, 347, 349  
luminosity function  
galaxies, 100, 319-321, 323-325, 328,  
350  
globular cluster, 306  
globular clusters, 78, 104, 170  
open clusters, 170  
stellar, 78, 154, 221, 224, 268, 275
- M100, 191  
M101, 191, 236  
M11, 39  
M13, 39, 48, 61, 67, 76  
M15, 58, 69  
M3, 19, 40, 48, 67, 73, 75, 76, 78, 83,  
88, 278, 374  
M31, 28, 35, 96, 98, 100, 104, 181-191,  
374, 376  
brightest stars, 37  
bulge, 27, 184, 197, 263, 272  
clusters, 212  
disk, 27, 51  
globular clusters, 184, 207, 208  
halo stars, 184  
M32, 27, 37, 45, 182, 184, 191, 240, 241,  
249, 272  
M33, 60, 207  
M5, 278  
M67, 48, 49, 51, 374  
M71, 77  
M81, 333, 338  
M82, 333, 338  
M87, 96, 97, 99, 100, 212, 241-244, 246  
M92, 40, 48, 73, 75, 83, 88, 194  
Magellanic Clouds, 222  
abundance spread, 174  
abundances, 173-174  
clusters, 169-171, 201  
star formation, 175  
stellar populations, 169-179  
Magellanic Stream, 173, 388  
Main Sequence turn-off, 48, 64, 134,  
154, 157, 189, 194, 274, 278,  
358, 359, 362, 364, 389, 390  
mass-luminosity relation, 7, 12  
maximum disk hypothesis, 221, 228-  
234, 237  
McLaughlin, 3, 6, 17  
Menzel, 14  
mergers, 63, 96, 98, 102, 115, 125, 134,  
146, 148, 277, 299-307, 333,  
336, 338, 378, 389, 390  
microlensing, 222, 225  
Mira stars, 172, 376, 390  
Morgan, 263, 376  
MS2137-23, 256
- Newton, 251  
NGC 1140, 302  
NGC 121, 30  
NGC 1275, 99-102, 104, 302  
NGC 1316, 302  
NGC 1399, 96, 98-100, 243, 244, 264,  
266-268, 270, 280  
NGC 1466, 201  
NGC 147, 27, 182, 184  
NGC 1818, 171

- NGC 185, 27, 182, 184  
 NGC 1866, 169, 202, 204  
 NGC 1872, 201  
 NGC 188, 52  
 NGC 1903, 201  
 NGC 1978, 203  
 NGC 2031, 204, 205  
 NGC 2041, 201  
 NGC 205, 27, 37, 45, 182, 184  
 NGC 2107, 201  
 NGC 2134, 201  
 NGC 2136, 205  
 NGC 2157, 201  
 NGC 2164, 201  
 NGC 221, 182  
 NGC 2257, 201  
 NGC 2264, 48  
 NGC 2362, 48  
 NGC 2419, 67, 68  
 NGC 2423, 243  
 NGC 2434, 242, 243  
 NGC 2477, 202  
 NGC 2660, 202  
 NGC 2681, 360, 370  
 NGC 2808, 76, 87  
 NGC 288, 64, 65, 80  
 NGC 2903, 235  
 NGC 3098, 286  
 NGC 3109, 196  
 NGC 3115, 243  
 NGC 3198, 228, 235  
 NGC 330, 171  
 NGC 3311, 96, 97, 99, 105  
 NGC 3379, 244  
 NGC 3597, 100, 101, 302  
 NGC 362, 64, 65  
 NGC 3921, 302  
 NGC 4038, 300-302  
 NGC 4039, 300-302  
 NGC 4472, 101, 243  
 NGC 4552, 360, 370  
 NGC 4594, 243  
 NGC 4650A, 234  
 NGC 4839, 312  
 NGC 4874, 99  
 NGC 5044, 253  
 NGC 5102, 287  
 NGC 5128, 62, 96, 97  
 NGC 5253, 197  
 NGC 5866, 289  
 NGC 5907, 235, 237  
 NGC 6166, 99  
 NGC 6397, 77, 78  
 NGC 6528, 164  
 NGC 6553, 164  
 NGC 6791, 127, 270, 272  
 NGC 7006, 76  
 NGC 7252, 100-102, 104, 301, 302, 307  
 NGC 7332, 284-287  
 NGC 752, 48  
 NGC 7714, 300  
 NGC 7715, 300  
 NGC 7789, 202  
 NGC 7814, 227, 236  
 NGC 891, 227, 234, 236  
 non-Newtonian dynamics, 227, 236  
 nova, 26, 49, 51, 52  
 nucleosynthesis, 150, 345, 388  
  
 old disk, 111, 112, 155, 376, 377  
     mass-to-light ratio, 233  
     thickness, 232  
 Oort, viii, 32, 34, 37, 46, 50, 52, 57, 84,  
     139, 142, 221, 376  
 open clusters, 381  
     ages, 49, 52  
     CM diagram, 27, 48, 270  
  
 Pal 12, 64, 77  
 Pal 4, 67  
 Pal 5, 63  
 Pauli, 32  
 Payne-Gaposchkin, 10, 12, 17, 28, 34  
 Pegasus dwarf, 197  
 PIONEER 10, 237  
 planetary nebulae, 6, 49, 51, 52, 123  
 polar ring galaxy, 234  
 population boxes, 207, 390  
 Population I, 27, 42, 45, 47, 52, 169,  
     187, 207, 373-383, 391  
 Population II, 27, 39, 42, 45, 47, 51, 57,  
     58, 69, 83, 109, 169, 182, 187,  
     207, 263, 373-383, 391  
 population synthesis, 266, 273, 274, 331,  
     335, 366  
 post-AGB stars, 76, 129, 263, 264, 266,  
     268, 274  
 post-AGB stars, 266  
 Praesepe, 48  
 primeval galaxies, 344-346  
  
 Roman, 32

- ROSAT, 244, 247, 252-254  
 rotation curve, 218, 227-232, 245  
 RR 7, 87  
 RR Lyrae stars, vii, 25, 27, 37-39, 43,  
     51, 52, 59, 65, 83-85, 87-89,  
     91, 155, 169, 171, 172, 182, 194,  
     197, 202, 203, 206, 265  
 Ruprecht 106, 64, 77  
 Russell, 4, 6, 7, 9, 10, 13, 17, 32  
 Rutherford, 4, 13  
 S0 galaxies  
     evolution, 334-336  
     stellar ages, 285  
     stellar populations, 283-292, 299-307  
 SA 57, 87, 88, 91  
 Sagittarius dwarf, 58, 63, 64, 77, 80, 91,  
     115, 117, 162, 209, 378, 386  
 Salpeter, 19  
 Sandage, vii, 19, 28, 48, 73, 76, 109,  
     110, 113, 116, 147, 153, 183,  
     309, 389  
 scaleheight, 111, 130  
 Schönberg, 17, 48  
 Schmidt, 25  
 Schwarzschild, viii, 19, 21, 27, 32, 35,  
     48, 50  
 Sculptor dwarf, vii, 27, 31, 182, 194,  
     195  
 second parameter, 65-66, 76, 77, 136,  
     207, 208  
 Sextans dwarf, 195  
 Shapley, 24, 27, 95, 169, 201, 383  
 Small Magellanic Cloud  
     abundances, 173  
     Cepheids, 173  
     clusters, 202  
     orientation, 173  
     star formation, 175  
 Solar neighborhood, 85, 86, 111, 119,  
     123, 126, 149, 155, 156, 158,  
     218, 221, 375, 377  
 spectral energy distribution, 273, 274,  
     322, 360  
 Spitzer, 27, 32, 52  
 star formation history, 150, 151, 175,  
     183, 187, 194, 206, 294, 299,  
     331, 332, 335, 379, 387, 389  
 starbursts, 175, 277, 299, 300, 333, 338  
 stellar evolution, 3-19, 45, 48, 54, 76,  
     203, 265, 271  
 stellar population models, 263, 329-342,  
     346-350  
 Stellar Populations, 23, 26, 45, 181-191,  
     275, 373-383, 385-386  
 Strömberg, 382  
 Strömgren photometry, 125, 132  
 Strömgren, 12, 14, 17  
 Stratton, 6  
 Struve, 10  
 subdwarfs, 38, 41, 43, 44, 52, 82, 86, 91,  
     129, 151, 266  
 super-metal-rich stars, 126  
 supernova, 18, 26, 28, 49, 60, 125, 139,  
     141, 147, 150-154, 158, 161,  
     176, 212, 222, 287, 288, 291,  
     366, 367, 372  
 supershell, 139  
 Swope, 32  
 Teller, 14  
 Terzan 7, 64, 77, 80  
 thick disk, 54, 84, 89, 91, 92, 111-113,  
     125, 130, 148, 156-158, 163,  
     375-377, 379, 386  
 thin disk, 125, 130, 148, 155, 158, 270,  
     375, 379, 386  
 Toomre's stability parameter  $Q$ , 233  
 triaxial models, 156, 240, 242-244, 246,  
     247  
 Trumpler, 26  
 Tucana dwarf, 195, 196, 198, 209  
 Tully-Fisher relation, 229  
 Tuve, 14  
 UGC 9799, 99  
 Unsöld, 11  
 Ursa Minor dwarf, 182, 194, 195, 209  
 Vatican Conference, vii, viii, 41, 43, 45-  
     54, 183, 263, 329, 374, 380  
 velocity dispersion, 49, 50, 98, 99, 111,  
     115, 120, 125, 130, 132, 133,  
     135, 137, 172, 207, 218, 232,  
     233, 239, 241, 243, 244, 249,  
     251, 264, 281, 289, 295, 310,  
     334, 361, 376, 377  
 Virgo cluster, 96, 98, 99, 263, 278, 310,  
     321, 361-363, 365, 369, 390  
 W Virginis stars, 27  
 weak-line stars, 38, 41

Weizsäcker, von, 13, 16

Whipple, 54, 273

white dwarfs, 6, 9, 13, 17, 49, 77, 127,  
150, 157, 161, 222

